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ABSTRACT

This study examined the effects of the field experience for student teachers in terms of pupil outcomes. Two main questions were posed: (1) Does the reading or mathematics achievement of pupils in classrooms with a student teacher differ from the achievement of pupils in classrooms without a student teacher? and (2) Among classrooms with a student teacher, does the semester (fall, spring, or both) the student teacher is present make a difference in reading and mathematics achievement? Data on cooperating teachers' (N=277) and comparison teachers' (N=269) elementary classrooms from a two-year period in the Austin (Texas) Independent School District were examined. The results indicated that there were no statistically significant main effects for the presence or absence of a student teacher or for the semester the student teacher was in the classroom. Although observational and anecdotal evidence suggests that student teachers often experience difficulties in adjusting to the classroom, the results of this study indicate that the presence of the student teacher has neither positive nor adverse effects on achievement. References and statistical data gathered for the study are included. (JD)

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**STUDENT TEACHERS IN THE CLASSROOM:
BOON OR BANE?**

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Abstract

Research on the student teaching field experience has focused primarily on outcomes in terms of student teacher behaviors, attitudes, and characteristics. Very little attention has been paid to the effects of the field experience in terms of pupil outcomes. Part of the difficulty in linking the field experience with pupil outcomes deals with constructing a methodological and statistical design to control some of the numerous variables that influence pupil achievement in order to examine student teacher effects. The present study was designed to answer two main questions: 1) Does the reading or mathematics achievement of pupils in classrooms with a student teacher differ from the achievement of pupils in classrooms without a student teacher? and 2) Among classrooms with a student teacher, does the semester (fall, spring, or both) the student teacher is present make a difference in reading or mathematics achievement? The null hypotheses for these questions were tested using analysis of covariance simultaneous regression models using the class mean grade equivalent score as the dependent variable. The mean pretest score and a variety of other variables were used as covariates in the model. Full and restricted models were compared to examine the effect of the variable for the presence of a student teacher or for the semester(s) a student teacher was in the classroom. Data on cooperating teachers' (n=277) and comparison teachers' (n=269) elementary classrooms (grades 1-6) from a two-year period (1985-86 and 1986-87) in the Austin (TX) Independent School District were examined. The results indicated there were no statistically significant main effects for the presence or absence of a student teacher or for the semester the student teacher was in the classroom. Acceptance of the null hypotheses is educationally significant. Although observational and anecdotal evidence suggests that student teachers often experience difficulties in adjusting to the classroom, the results of this study indicate that the presence of the student teacher has neither positive nor adverse effects on achievement.

STUDENT TEACHERS IN THE CLASSROOM: BOON OR BANE?

Within the larger field of teacher education, research on student teaching processes has focused on five main areas of investigation: 1) student teacher attitudes, characteristics, and personality, 2) the socialization of student teachers, 3) predictors of success in student teaching, 4) interpersonal relationships in student teaching, and 5) experimental attempts to modify student teacher behaviors (Zeichner, 1978). Lanier and Little (1986) identified concern with teachers' thinking and judgment processes as the most recent focus of research, which is a shift from the previous emphasis on effects in terms of student teacher behavioral and attitudinal outcomes. Indeed, research on student teaching has focused almost exclusively on the impact of the field experience upon the student teacher. However, neither past nor current research trends have focused on the effect of the student teaching field experience upon the pupils in the classroom.

Peck and Tucker (1973) observed a trend in the research toward linking teacher education to its consequences in terms of pupils' cognitive, affective, and behavioral outcomes. Although much is now known about teacher effects in terms of pupil outcomes (see, e.g., Brophy & Good, 1986), little is actually known about the consequences of the field experience for pupil outcomes, particularly achievement. By providing descriptive accounts from observations and content analyses of supervisory interactions, recent naturalistic studies have done much to promote understanding of what occurs in classrooms in which student teachers are present (Doyle, 1979; Griffin, 1984; Koehler, 1986). What is still not understood, however, is how the student teacher alters the classroom context and if (and how) the field experience setting influences pupil outcomes.

Cooperating teachers have cited disadvantages of having a student teacher in the classroom (Dillon-Peterson, 1982) and have expressed concern about potential negative consequences of having a student teacher in the classroom (Koerner, 1988). The student teacher field experience is like a rite of passage for the teacher-to-be. Practical experience in a classroom has become such a sacrosanct aspect of teacher preparation programs that the presence of the student teacher is commonplace, and the impact on pupils--either positive or negative--seems to be of little consequence.

A few studies have measured pupils' learning following instruction by a student teacher, but no study has investigated the impact of having a student teacher in the classroom upon the achievement of pupils in the classroom over the course of the year. Therefore, the purpose of this study is to investigate the impact of the presence of the student teacher in the elementary classroom on the reading and mathematics achievement of pupils as measured by standardized tests.

Specifically, there were two research questions: 1) Does the reading and mathematics achievement of pupils in elementary classrooms with a student teacher differ from the achievement of students in classrooms in which no student teacher was present? and 2) For classrooms with a student teacher, are there differences in pupil achievement among classrooms with a student teacher present during the fall, the spring, or both semesters? The second question, in effect, examines the first question from another perspective. If student teachers impact achievement, is the impact greater in classrooms with a student teacher for two semesters?

Hypotheses were formulated to address the research questions. The overriding question of this study was whether having a student teacher in the classroom makes a difference in achievement gains. Therefore, the first and primary hypothesis, stated as the null hypothesis was:

H1: The class mean reading comprehension or mathematics posttest achievement scores of pupils in elementary classrooms in which a student teacher is present do not differ from the mean posttest reading or mathematics scores of pupils in classrooms without a student teacher after controlling for pupils' mean pretest level of achievement and demographic characteristics of the classroom and of the regular classroom teacher.

Even if there are no main effects for classrooms with and without a student teacher, there may exist differences among classrooms with a student teacher, or if there is impact, impact may differ for time of year or number of semesters the student teacher is present. In Austin, Texas where the study was conducted, field experience assignments are typically scheduled for six to 10 weeks during the spring semester. Fall semester field experiences are slightly less common. Some cooperating teachers accept a student teacher for both semesters. The student teaching program in the Austin Independent School District did not offer year-long assignments at the time the study was conducted. The second hypothesis, stated as the null, was:

H2: There is no difference in the mean reading comprehension or mathematics achievement of pupils in classrooms with a student teacher during the fall only, spring only, or both semesters

after controlling for previous level of achievement and demographic characteristics of the classroom and of the teacher.

Several areas of research, drawn from the student teaching and effective teaching literatures, offer rationales for hypothesizing that student teachers in the elementary classroom impact pupil achievement. In addition, there is much observational and anecdotal evidence to suggest that the presence of a student teacher may be associated with decreased levels of time-on-task, learning, and achievement.

Review of the Literature

The student teaching field experience has multiple goals and objectives for the socialization of the prospective teacher. Student teachers are expected to possess and demonstrate many competencies and skills. Expectations for student teacher behavior were examined by Griffin (1983) and found to be global and general and lacking in specificity regarding how the expectations would be achieved. The lack of clearly prescribed role expectations for the student teacher suggests that many field experience programs operate with implicit assumptions regarding responsibilities and parameters for expected and acceptable behaviors. Studies which addressed the expectations for the role of cooperating teacher have found that there is not unequivocal agreement among incumbents of the student teaching triad positions of what the role expectations are for the cooperating teacher or even if the cooperating teacher has executed certain responsibilities (Brown, Clark, & Sorrill, 1986). Grimmer and Ratzlaff (1986) sought to identify cooperating teacher role expectations that transcend time and context boundaries and found just five general expectations. As a result of their investigation, the authors believe that the role of the cooperating teacher is poorly defined and that teachers are generally unprepared for the task of supervising student teachers.

The expectations for the goals and objectives of the practicum are not always clear. At times, the outcomes of the field experience may be at odds with or fall short of the stated purposes of student teaching. Zeichner (1978) proposed that student teaching has latent consequences that are in conflict with the expressed purposes. Observations of the student teaching process revealed that student teachers were involved in a limited range of activities, and they had little control over the classroom activities or decisions regarding the "what," "how," and "when" of instruction

(Tabachnick, et al., 1978).

Much research has focused on the concerns and difficulties of student teachers. Their concerns and problems are the same teacher behaviors that are linked to pupil achievement in the effective teaching literature. Unfortunately, many studies have relied on self-report data obtained from questionnaires and sometimes interviews rather than on observational or low-inference techniques. Therefore, whether student teachers' perceptions of their difficulties actually relate to classroom performance or impact pupil learning is not clearly known.

Beginning teachers most frequently cite classroom discipline as their primary concern, but among student teachers it ranked eighth; motivating students was the primary concern of student teachers (Veenman, 1984). Hart (1987) found that in the free responses to queries of their concerns, student teachers most frequently reported anxiety about class control and discipline. However, when items on a student teacher anxiety scale were factor analyzed, anxiety over being evaluated accounted for most of the variance. Fuller (1969) found that student teachers were at first concerned with their own adequacy and performance and only later developed concerns about pupils' learning and achievement. The content of supervisory conferences, which was examined by Griffin (1983), revealed that student teachers are concerned with the specifics of curriculum and instruction, and disciplinary concerns rate a distant second. Although discipline and management issues arouse concern or anxiety among student teachers, they are more concerned with their own performance.

Perhaps, because unlike beginning teachers, student teachers do not appear to be as aware of or concerned with classroom management, difficulties with management and a gradual relaxation of order has been observed in classrooms with a student teacher (Barnes and Defino, 1983). There is evidence which indicates that student teachers have difficulty learning the classroom environment with respect to management issues (Koehler, 1986) and developing propositional knowledge (conceptual systems) about classroom events (Doyle, 1979, 1985). Propositional knowledge enables the teacher to account for classroom events and to respond appropriately to pupil behaviors. Unsuccessful student teachers attempt to reduce classroom complexity by ignoring the simultaneity and multidimensionality of classroom events by localizing attention to one area of the classroom or by being involved in one activity at a time. For these student teachers, complexity and disruptions increased over the field experience period. On the

other hand, for student teachers identified as successful managers, on-task behavior was high (Doyle, 1977). Hence, effective classroom management depends, in part, upon having propositional knowledge of classroom events. Effective classroom management increases on-task behavior, which Good (1979) found to relate to achievement in every process-product study reviewed. The hypothesis that the presence of a student teacher impacts pupil achievement is supported, primarily, by the link between classroom management, time on task, and achievement.

Research on the presence of additional instructional adults also lends rationales for the hypothesis; however, research evidence linking the presence of additional instructional adults to student achievement is not extensive. Ward and Tikunoff (1979) discussed how the control mechanisms established by the teacher may change when another person enters the instructional-social system. The net effect of a redistribution of power and authority may be disruption of routines and the overall instructional climate. Research on team teaching, which represents an environment with shared or alternating authority, has not established positive effects in terms of learning and achievement (Cooper & Sterns, 1973; Paige, 1967).

An evaluation study on the use of bilingual aides in the classroom revealed that the achievement gains of limited-English proficient (LEP) pupils in classrooms served by aides were about the same as or less than the gains of pupils not served by aides (Schuyler, 1986). In another evaluation study of a bilingual project, Wilkinson (1976) found that classrooms with additional instructional adults were characterized as having lower achievement than comparable classrooms without aides. The student teaching field experience is different from both team-teaching structures and bilingual aides, and generalizeability from these settings to the field experience is limited.

Unfortunately, studies attempting to associate the presence of the student teacher in the classroom with pupil achievement suffer from methodological shortcomings. A study by McIntyre, Copenhaver, Jacko, and O'Bryan (1982) attempted to determine pupil perceptions of differential effects of student teachers and cooperating teachers on ten variables of classroom environment. The single group pretest-posttest design revealed that pupils' perception of their efforts to strive for success (achieve), to persist in overcoming obstacles, to respect authority, and to think objectively were significantly lower when taught by the student teacher than when they were taught by the cooperating teacher. Interpreting the study as a measure of student teacher impact or the findings as indicating adverse effects may be risky. The design did not include a

control group or any experimental controls, nor were the variables examined conceptually or operationally defined by the authors. Furthermore, the dependent variables were attitudes or perceptions and not actual, observed changes in the classroom environment or in pupil performance.

A study of the impact of student teachers on the achievement and attitude of high school students by Seagren (1967) found that pupils instructed entirely by student teachers for four years in a laboratory high school achieved higher on college entrance exams than did pupils instructed in a regular high school even after controlling for pupils' IQ and socioeconomic level. Nevertheless, the context of the laboratory school is not representative of the student teaching context in public schools. Although the student teachers in the study were under supervision, they were the primary classroom teachers. Therefore, generalizeability to other contexts is limited.

A third study on the effect of student teachers on pupil achievement by Farnsworth and Garcia (1980) compared the raw mean Stanford Achievement Test (SAT) scores of students in grades 3 to 6 in three schools to the raw mean SAT scores of pupils in three comparison schools. No significant differences were detected. However, the study was fraught with weaknesses in data analysis techniques. In the schools with student teachers, only 35% to 60% of students at any given grade level were instructed by a student teacher. Within the experimental schools, data were aggregated over students with and without a student teacher and across all three schools. Any differential school or teacher effects were masked by the aggregation. Furthermore, in the posttest only design, the researchers could not measure change or gain, nor did they control for initial differences in achievement or individual differences.

The present study was conducted to investigate whether student teachers affect pupil achievement merely by their presence in the elementary classroom. The study used matched classrooms and analysis of covariance regression techniques in an effort to impose statistical controls to reduce error variance and to make methodological improvements over previous research on the topic. Determining whether student teachers in the classroom have an effect logically precedes any investigation into how student teachers affect achievement or the nature of classroom interactions which influence achievement. Undoubtedly, characteristics of the student teacher could influence the classroom climate and impact learning and achievement, but this study is concerned strictly with the question of whether the *presence* of another instructional adult, a

novice teacher, is associated with greater or lesser gains in achievement when compared to classrooms without a student teacher.

Method

Subjects

Teachers. Elementary teachers in the Austin (TX) Independent School District (AISD) who served as cooperating teachers during the 1985-86 or 1986-87 school years were selected for the study. Cooperating teachers were not included if the student teaching assignment was in kindergarten (for lack of pretest scores), special education, music, physical education, or library, or if the student teacher assignment was at an elementary school with a schoolwide Chapter 1 program. In addition, cooperating teachers were not included in the study if the student teacher transferred to another cooperating teacher during the assignment or if the student teacher's schedule was for less than the equivalent of four full days.

From a computer printout of all AISD elementary teachers, comparison teachers were matched on the following characteristics in order of priority: grade level, whether the job assignment description included "ESL" (English as a Second Language), "BIL" (Bilingual) or neither, ethnicity, sex, total years teaching experience, career ladder step, and as many as possible of the four endorsements listed on the printout.

The selection process yielded a pool of 585 teachers (293 cooperating teachers and 292 comparison teachers) over the two-year period. For each group of teachers the ethnic distribution was 70% Anglo, 11% Black, and 18% Hispanic.

Pupils. Pupils were selected for the study if they were in one of the selected classrooms and they had valid pretest and posttest scores in reading and mathematics. Pupils were omitted if they entered after the first week of school or left before the beginning of the administration of the posttest, if they changed schools during the year, if they were monolingual non-English or bilingual dominant in a language other than English (AISD limited English proficient (LEP) codes A and B), or if they received special education services for 50% or more of the instructional time. The variables included on the pupil database were: sex and ethnicity, grade, low-income status (eligible for free or reduced-price lunch program), desegregation status (reassigned, in an impacted

school, transferred), and pretest and posttest mathematics and reading grade equivalent scores. The ethnic composition of pupils in the sample was 55% Anglo/Other, 18% Black, and 27% Hispanic. A total of 8,387 pupils were included in the study; 4,344 were in cooperating teachers' classrooms, and 4,043 were in comparison teachers' classrooms. The percentage of total pupils at each grade level was: 1st - 21%, 2nd - 18%, 3rd - 18%, 4th - 14%, 5th - 14%, 6th - 14%. Only at sixth grade was there a difference in the percentage of pupils in cooperating teachers' classrooms (16%) and in comparison teachers' classrooms (13%).

Instrumentation

The Iowa Tests of Basic Skills (ITBS), Form 7, with 1982 norms, published by the Riverside Publishing Company was administered as the posttest to all elementary students each year in April (April 15-17, 1986 and April 21-23, 1987) with make-up exams given during the days following the regular test administration for pupils who were absent. The ITBS reading total and mathematics total grade equivalents from the previous school year were the pretest scores used as covariates. The reading total and mathematics total grade equivalents for 1986 or 1987 were the posttest measures used as the dependent variables. Grade equivalent scores for the ITBS are on an equal-interval scale (Hieronymus, Hoover, Lindquist, *et al*, 1986), and so it is appropriate to perform mathematical functions on them.

Procedures

A database containing teacher information was created with the following variables: school location, grade level, sex, ethnicity, years experience in and out of AISD, career ladder step, and annual evaluation rating (on a 1-5 scale) and the fall and spring entry and exit dates and the total number of days a student teacher was present each semester in cooperating teachers' classrooms.

The teacher data were examined for discrepancies and errors. Duplicate records or records with irreconcilable errors were eliminated. Teachers showing a discrepancy between their grade level assignment and pupils' grade equivalent test scores were omitted. Classrooms with seven or fewer students after restrictions were applied were deleted. The decision to omit teachers with seven or fewer students was based on an examination of the pupil frequencies at each grade. About 92% of the classrooms had nine or more pupils; about 5% of the classes had seven or fewer pupils. Only seven classes had eight pupils; because there were so few with eight pupils, those

classes were retained rather than omitted. The assumption was made that the mean scores of pupils in smaller classrooms were representative of the entire class (before sample restrictions eliminated pupils).

The clean-up process resulted in the retention of 277 cooperating teachers and 269 comparison teachers, a reduction in the original groups of 5.5% and 7.9% respectively. Figure 1 shows the frequency of teachers at each grade level. The ethnic composition of teachers in the final data set was 73% Anglo, 11% Black, and 16% Hispanic.

As part of the statewide teacher assessment program mandated by the Texas State Legislature under House Bill 72, teachers are evaluated each year on a five-point scale. The teacher's evaluation rating score is based on a total of four observations by two trained observers. Each teacher's score was transformed into a z-score based on the mean evaluation rating for all teachers in the school. The comparability of the two groups of teachers in terms of evaluation ratings was checked to consider the advisability of including evaluation z-scores as a covariate. The t-test comparing the mean evaluation z-score of the two groups was significant for 1985-86 ($t = -3.2, p < .005$) and for 1986-87 ($t = -4.9, p < .0001$). The cooperating teachers had a higher mean score (by .34 in 1985-86 and by .46 in 1986-87) and a smaller standard deviation each year. The significant difference warrants the inclusion of the evaluation z-score in the regression equation to determine its contribution to predicting the dependent variable.

Figure 1
Frequency of Teachers by Grade Level

Grade	Cooperating Teachers				Comparison Teachers
	Fall	Spring	Both	Total	
1	28	31	12	71	66
2	10	29	13	52	52
3	12	28	8	48	49
4	16	14	8	38	36
5	13	15	8	36	36
6	7	19	8	34	30
Total	86	136	55	277	269

Analysis

Analysis of covariance regressions were performed using the SAS (Version 5) regression procedure (PROC REG). First, the most parsimonious model was sought to predict reading and mathematics achievement at each grade level. Simultaneous regression models with all variables entered were run to examine the contribution of the covariates to predicting the dependent variables.

$$\text{PostRx} = U + b_1 \text{PreRx} + b_2 \text{CT} + b_3 \text{TBlk} + b_4 \text{THsp} + b_5 \text{SEval} + b_6 \text{YrsExp} + b_7 \text{BlkPct} + b_8 \text{HspPct} + b_9 \text{ReasPct} + b_{10} \text{LowPct} + \text{Error} \quad (\text{H1a.1})$$

$$\text{PostMx} = U + b_1 \text{PreMx} + b_2 \text{CT} + b_3 \text{TBlk} + b_4 \text{THsp} + b_5 \text{SEval} + b_6 \text{YrsExp} + b_7 \text{BlkPct} + b_8 \text{HspPct} + b_9 \text{ReasPct} + b_{10} \text{LowPct} + \text{Error} \quad (\text{H1b.1})$$

Where:

- PostRx = Reading posttest class mean grade equivalent score,
- PostMx = Mathematics posttest class mean grade equivalent score,
- PreRx = Reading pretest class mean grade equivalent score,
- PreMx = Mathematics pretest class mean grade equivalent score,
- CT = 1 if the teacher served as a cooperating teacher, 0 otherwise,
- TBlk = 1 if the teacher is Black, 0 otherwise,
- THsp = 1 if the teacher is Hispanic, 0 otherwise,
- SEval = Teacher evaluation rating standard score (z-score),
- YrsExp = Total years teaching experience,
- BlkPct = Percentage of Black pupils in the teacher's class,
- HspPct = Percentage of Hispanic pupils in the teacher's class,
- ReasPct = Percentage of pupils in the teacher's class reassigned for desegregation,
- LowPct = Percentage of pupils in the teacher's class who were low income.

The beta weight parameter estimates and the probability of the t-value for the hypothesis that the parameter estimate is equal to zero were examined to determine which covariates to retain in the model at each grade level for predicting reading or mathematics mean posttest scores.

Appendix A presents the parameter estimates for each variable and the probability level for t .

Based upon the results of equations H1a.1 and H1b.1, the full model at each grade level was determined for testing for no difference between classrooms with a student teacher and classrooms without a student teacher in reading and mathematics. Each full model contained the vector with pretest scores and the vector, CT, containing 1 if a student teacher was present and 0 otherwise. Figure 2 below indicates which variables were in each full model.

Figure 2
Variables Contained in Full Model for Test of Hypothesis H1a and H1b

Variable	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	Read.	Math	Read.	Math	Read.	Math	Read.	Math	Read.	Math	Read.	Math
PreTest	X	X	X	X	X	X	X	X	X	X	X	X
CT	X	X	X	X	X	X	X	X	X	X	X	X
TBlk					X							
THsp		X										
SEval			X		X		X					
YrsExp				X					X			
BlkPct			X	X								
HspPct			X	X								
ReasPct							X					
LowPct		X										

Each full model was of the form:

$$\text{PostRx} = U + b_1 \text{PreRx} + b_2 \text{CT} + (\text{other covariates specified for the grade level}) + \text{Error} \quad (\text{H1a.2})$$

$$\text{PostMx} = U + b_1 \text{PreMx} + b_2 \text{CT} + (\text{other covariates specified for the grade level}) + \text{Error} \quad (\text{H1b.2})$$

To test hypothesis H1a (reading) and H1b (mathematics), the restriction that the expected value of the parameter estimate of variable CT is equal to zero [$E(CT) = 0$] was applied through the use of a TEST statement in the model statement in the PROC REG procedure. Each restricted model, therefore, had one fewer parameter to estimate. The numerator degrees of freedom for the F-test that $E(CT) = 0$ was 1; the denominator degrees of freedom was determined by the number of parameters in the full model. Specifically, the restricted models were:

$$\begin{aligned} \text{PostRx} = & U + b_1 \text{PreRx} + (\text{other covariates specified for the grade level}) \\ & + \text{Error} \end{aligned} \quad (\text{H1a.3})$$

$$\begin{aligned} \text{PostMx} = & U + b_1 \text{PreMx} + (\text{other covariates specified for the grade level}) \\ & + \text{Error} \end{aligned} \quad (\text{H1b.3})$$

Hypothesis H2 (H2a for reading and H2b for mathematics) was tested with analysis of covariance simultaneous regression models to look for differences among classrooms with a student teacher present at some time during the year. The variables identified for inclusion in the models to test hypotheses H1a and H1b were also entered in the models to test hypotheses H2a and H2b. In addition to the covariates that were included in the models to test hypotheses H1a and H1b, variables indicating when the ST was present were also included. Specifically, the full models used were:

$$\begin{aligned} \text{PostRx} = & b_1 \text{PreRx} + b_2 \text{Fall} + b_3 \text{Spring} + (\text{covariates indicated for the grade level}) \\ & + \text{Error} \end{aligned} \quad (\text{H2a.1})$$

$$\begin{aligned} \text{PostMx} = & b_1 \text{PreMx} + b_2 \text{Fall} + b_3 \text{Spring} + (\text{covariates indicated for the grade level}) \\ & + \text{Error} \end{aligned} \quad (\text{H2b.1})$$

Where:

PostRx = Posttest mean reading grade equivalent score,

PostMx = Posttest mean mathematics grade equivalent score,

PreRx = Pretest mean reading grade equivalent score,

PreMx = Pretest mean mathematics grade equivalent score,

Fall = 1 if a ST was present fall semester only, 0 otherwise,

Spring = 1 if a ST was present spring semester only, 0 otherwise,
(both semesters was indicated by a 0 in vectors Fall and Spring).

To test for main effects for the semester the student teacher was present, the restriction was applied that $b_2 = b_3 = 0$. That is, that the expected value for the parameter estimates for the vectors indicating the semester are both equal to zero. Accepting the null hypothesis would indicate that there are no differences among the semesters. The restricted models, therefore, were:

$$\text{PostRx} = U + b_1 \text{PreRx} + (\text{other covariates}) + \text{Error} \quad (\text{H2a.2})$$

$$\text{PostMx} = U + b_1 \text{PreMx} + (\text{other covariates}) + \text{Error} \quad (\text{H2b.2})$$

Results

To test hypothesis H1 for main effects for the presence or absence of a student teacher, the model with the restriction that $E(\text{CT}) = 0$ was compared to the full model. The test of hypothesis H1a for reading achievement yielded no significant F-values. The reading achievement scores of classrooms with a student teacher at each grade level did not differ from the achievement of classrooms without a student teacher. At each grade level the null hypothesis was accepted. The model comparisons for the test of hypothesis H1b for student teacher main effects for mathematics yielded no significant F-values with the exception of grade 3 ($F = 6.097$, $df = 1, 92$, $p = .0154$). The mean adjusted posttest score for classrooms with a student teacher was greater than the mean score for comparison classrooms (4.31 vs. 4.27 grade equivalents). Appendix B presents the source table for the test of hypothesis H1 at each grade level and the results of each F-test comparing the full and restricted models to determine main effects for the presence of a student teacher.

The regression models for predicting reading accounted for 51% (grade 1) to 97% (grade 6) of the total variance, with a mean of 84%. The models predicting mathematics posttest achievement accounted for 74% (grade 1) to 93% (grade 6) of the variance, with a mean of 82%. The pretest level of achievement accounted for most of the variance accounted for by the model. That is, pretest achievement was the single best predictor of posttest achievement.

Within the classrooms which had a student teacher, hypothesis H2 tested for main effects

for the semester the student teacher was in the classroom on reading (H2a) and mathematics (H2b) achievement. The model comparisons yielded no significant F-values for reading or mathematics. There were no statistically significant differences among classrooms with a student teacher for the fall semester, spring semester, or both semesters at any grade for either reading or mathematics achievement. Appendix C presents the source tables for the results of testing hypothesis H2 at each grade level and summarizes the results of the model comparisons testing for semester main effects.

The regression models for predicting reading achievement among classrooms with a student teacher accounted for up to 97% (grade 6) of the variance with a low of 39% at grade 1. Excluding grade 1, the average percentage of variance accounted for was 89%. When predicting mathematics, the proportion of variance accounted for by the models ranged from 65% (grade 1) to 96% (grade 6) with a mean of 78.5%. Again, pretest achievement represented most of the variance accounted for by the model.

Discussion

That there were no statistically significant differences in achievement for classrooms with a student teacher compared to classrooms without a student teacher, with the exception of mathematics, grade 3, are educationally significant findings. The lone statistically significant finding, against the background of the other nonsignificant results, is not educationally interpretable or particularly interesting. The difference of less than one month in adjusted posttest scores for the two groups was not large enough in terms of grade equivalents to be of much educational interest or concern.

The results of this study suggest that student teachers' presence in elementary classrooms is not a force sufficiently powerful to influence pupil achievement as measured by standardized tests of basic skills in reading and mathematics. Also, there were no significant main effects for the semester the student teacher was present. There were no differences between classrooms with a student teacher during the fall or spring semester. Furthermore, the achievement of pupils in classrooms with a student teacher both semesters did not differ from the achievement of pupils in classrooms with a student teacher for one semester.

With most of the variance in the prediction of posttest achievement accounted for by the

pretest level of achievement, very little variance remained to be predicted by the inclusion of a vector for the presence of the student teacher, or the semester a student teacher was present, or by the inclusion of demographic characteristics or any other variables.

The hypothesis that student teachers in the classroom may affect pupil achievement came primarily from observational studies which found a relaxation of order and an increase in inappropriate pupil behavior, and an increase in management problems (Barnes & Defino, 1983) and from research by Doyle (1977, 1979), and Koehler (1986) which found that student teachers experienced difficulty learning classroom routines and propositional knowledge to deal with complexity. Unsuccessful managers were the ones who typically experienced difficulty and had classrooms characterized by lower work involvement and higher levels of off-task behaviors (Doyle, 1977). However, research also indicates that many student teachers have a successful field experience and exhibit evidence of being successful classroom managers.

Several hypotheses may be proposed to explain why no student teacher effects were found. Cooperating teachers in the sample had significantly higher evaluation ratings than comparison teachers, indicating that those who volunteer or are selected to be cooperating teachers tend to be better teachers, at least on those dimensions of teaching that are evaluated. Although the parameter estimate for the evaluation rating variable was not significant in many of the regression equations, that it was significant at some grade levels (see Figures A.1 and A.2) suggests that teacher quality warrants consideration. If teacher evaluation ratings were not controlled, greater achievement gains might have been found in cooperating teachers' classrooms simply because they were, on the average, better teachers. Cooperating teachers may be able to offset, avert, or preclude any negative impact of student teachers on pupil achievement because they are high-quality teachers.

In practice, student teachers actually possess little control over instruction. Student teachers, like regular classroom teachers, are responsible for implementing the established curriculum. For the most part they may even follow the cooperating teacher's lesson plans with little or no modification. Student teachers use their own style to present lessons, but the "what" of instruction generally is determined (Tabachnick, et al., 1978), especially in the areas of reading and mathematics. Student teachers may make some decisions about materials, activities, and method of delivery but few or none about curriculum content and instructional objectives. Like regular classroom teachers, student teachers are concerned with moving pupils through the curriculum to

meet minimum promotion standards.

Evidence from Griffin's (1983) investigation into the content of supervisory conferences and student teacher journals using an Austin, TX sample indicates that there is much preoccupation with situation-specific instructional issues relating to materials and methods. Student teachers were primarily concerned with how to execute the lesson, and there was little concern or preoccupation with planning for longer periods of time. The cooperating teacher, who tended to dominate interaction in the conferences, gave highly specific suggestions and directions about curriculum planning at the lesson level. Apparently, the cooperating teacher still maintains a great deal of control over the instruction delivered by the student teacher. The cooperating teacher is also likely to retain ultimate control of the classroom environment. It is unlikely that the cooperating teacher would permit discipline and classroom management problems to develop to the point of interfering with instruction and learning.

Another explanation for why achievement was not depressed by student teachers could be because, as Dillon-Peterson (1982) learned from teachers, student teachers provide an extra pair of hands to assist pupils, cause cooperating teachers to be more organized and analytical about teaching, and motivate the cooperating teacher to model excellence in teaching.

That the data revealed that student teachers did not affect achievement may be a statement of fact, but on the other hand, failure to detect impact might be a matter of model specification. Including student teacher characteristics, such as evaluation ratings or managerial effectiveness, as independent variables may reveal if differences in pupil achievement are related to differences in student teacher characteristics and classroom behaviors. Whether the presence of student teachers is associated with pupil outcomes might be discovered through a combination of quantitative and qualitative methods, including low-inference classroom observations.

Aggregating data over all student teachers, as was done in this study, fails to reveal differential student teacher effects if they exist. The selection of the classroom as the unit of analysis hides within-class variability, limiting the likelihood of finding any significant differences. The choice of the classroom as the unit of analysis was the logical consequence of focusing on the impact of the student teacher. Typically, data are aggregated across pupils in classrooms in research on teacher effectiveness. Debate has addressed the appropriate unit of analysis in educational research (e.g., Hopkins, 1982; Slavin, 1983). The primary shortcoming of

aggregating data across pupils is that classroom level analyses miss evidence of differential effects of teachers on subgroups of pupils, just as aggregating data across classrooms within a school masks teacher differences.

The effects of education on pupils is a complex interaction of pupil, teacher, and school variables. Ideally, an analytic method would identify educational effects where they occur at each level of the educational system without disregarding the interaction effects within and between levels. Sources of variation in educational outcomes include within-class and between class variance. A multilevel method of analyzing classroom data was discussed by Burstein, Linn, and Capell (1978). Between-class analyses, they showed, were inadequate when there were heterogeneous within-class slopes. Neither pupil-level nor class-level analyses based on class means yield correct estimates if there are within-class differences.

In the present study, the absence of any significant differences between the two groups could be related to using class means. Without reanalyzing the data, it is not known whether student teachers influence the achievement of pupils who differ in demographic or academic characteristics. Rather than examine within group differences (and there are several possible decisions for the basis of defining subgroups, any of which could be challenged), initial differences in classroom characteristics were controlled through the use of analysis of covariance regression models. Nevertheless, controlling for classroom differences may yield different results than if differences were controlled at the subgroup or individual level. Aggregating data across students is a decision with consequences in terms of information loss, but on the other hand, methodological approaches to multi-level analysis of data are cumbersome, and the analytical viability of such methods has not been thoroughly explored (Shavelson, Webb, & Burstein, 1986).

Interpreting the results of multilevel analyses for data which have been decomposed into various levels of unit of analysis or for subgroup comparisons potentially can be very complex and confusing. There are many possible ways of designing and analyzing a study on the effect of student teachers on pupil achievement, and research still needs to be conducted to examine how student teachers with various characteristics may influence the academic environment of the classroom and affect learning and achievement of pupils as groups and as individuals. The challenge in research on teacher effectiveness is to design a method of analysis which is attuned to

the natural phenomena of classrooms. The present study, however, has revealed that, at least when the data were examined at the classroom level, having student teachers in the classroom for one semester or two has neither positive nor adverse effects on pupils' achievement of basic skills in reading or mathematics.

The title of this paper asked if student teachers in the classroom are a boon or a bane. As was discussed, other methods of analysis may possibly arrive at different results from which different conclusions may be drawn. However, based on the design and results of this study, student teachers represent neither a boon nor a bane for pupil achievement. In this case, no news is good news.

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Appendix A

Figure A.1

Prediction of Reading Mean Scores:

Parameter Estimates and Probability of T-Value (Equation H1a.1)

Parameter	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	Est.	Prob.	Est.	Prob.	Est.	Prob.	Est.	Prob.	Est.	Prob.	Est.	Prob.
PreTest	.66	.0001	.95	.0001	.85	.0001	1.11	.0001	1.07	.0001	1.07	.0001
CT	-.04	.54	-.006	.91	-.03	.51	.05	.40	-.03	.50	-.03	.47
TBlk	.36	.14	.001	.99	-.05	.59	-.12	.07	-.09	.35	.105	.12
THsp	.11	.31	.03	.69	.005	.93	-.07	.54	-.06	.40	.09	.21
SEval	.02	.59	.07	.036	.05	.08	.06	.08	-.01	.76	.01	.75
YrsExp	.006	.20	-.001	.66	.001	.60	.002	.61	.01	.02	-.001	.78
BlkPct	-.003	.15	-.004	.035	-.002	.19	-.002	.41	-.003	.19	-.002	.16
HspPct	-.004	.08	-.008	.0003	-.00	.63	-.002	.45	-.003	.16	-.003	.14
ReasPct	.003	.06	.001	.41	-.00	.49	-.002	.06	-.001	.21	-.001	.25
LowPct	-.002	.33	-.00	.80	-.001	.49	.001	.54	.002	.34	-.00	.82

Figure A.2

Prediction of Mathematics Mean Scores:

Parameter Estimates and Probability of T-Value (Equation H1b.1)

Parameter	Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6	
	Est.	Prob.	Est.	Prob.	Est.	Prob.	Est.	Prob.	Est.	Prob.	Est.	Prob.
PreTest	.76	.0001	1.00	.0001	.79	.0001	1.00	.0001	1.12	.0001	1.14	.001
CT	.02	.56	-.03	.59	-.08	.057	-.05	.44	-.03	.58	.06	.35
TBlk	.22	.13	-.007	.93	-.22	.01	-.07	.35	-.09	.54	.19	.07
THsp	.14	.04	-.007	.92	-.04	.43	-.067	.66	.01	.90	.01	.91
SEval	.04	.06	.045	.17	.13	.0001	.11	.009	.01	.74	.04	.25
YrsExp	.003	.21	-.01	.03	.002	.45	.005	.37	.004	.53	.001	.76
BlkPct	-.001	.49	-.007	.000	-.0086	.001	.61	.001	.76	.00	.91	
HspPct	-.002	.14	-.005	.015	-.001	.66	-.004	.20	.00	.91	.001	.79
ReasPct	.002	.06	.002	.08	-.001	.31	-.002	.10	-.002	.16	-.001	.26
LowPct	-.003	.01	.00	.99	-.007	.24	.00	.87	-.00	.82	.00	.91

Appendix B

Figure B.1

Reading: Analysis of Covariance Regression Results
for Hypothesis H1 (Equation H1a.2)

GRADE	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROBABILITY
1	Model	2	22.711	11.356	70.927	.0001
	Error	134	21.454	0.160		
	Total	136	44.165			
2	Model	5	41.806	8.361	123.542	.0001
	Error	97	6.565	0.067		
	Total	102	48.371			
3	Model	2	20.906	10.453	231.493	.0001
	Error	94	4.244	0.045		
	Total	96	25.151			
4	Model	3	38.194	12.731	257.717	.0001
	Error	68	3.359	0.049		
	Total	71	41.554			
5	Model	3	37.290	12.430	320.351	.0001
	Error	68	2.638	0.039		
	Total	71	39.928			
6	Model	2	52.443	26.221	1022.315	.0001
	Error	61	1.564	0.025		
	Total	63	54.008			

Figure B.2
Reading: Model Comparison F-Test Results
for Student Teacher Main Effects (Equations H1a.2 & H1a.3)

Grade 1	Numerator = .0007	df = 1	F = .0047
	Denominator = .1600	df = 134	Prob. = .9453
Grade 2	Numerator = .00001	df = 1	F = .0015
	Denominator = .0676	df = 97	Prob. = .9688
Grade 3	Numerator = .001	df = 1	F = .0323
	Denominator = .045	df = 94	Prob. = .8578
Grade 4	Numerator = .124	df = 1	F = 2.5175
	Denominator = .049	df = 68	Prob. = .1172
Grade 5	Numerator = .022	df = 1	F = .5293
	Denominator = .041	df = 69	Prob. = .4693
Grade 6	Numerator = .008	df = 1	F = .3301
	Denominator = .025	df = 61	Prob. = .5677

Figure B.3
 Reading: Classroom Mean Scores
 Cooperating Teachers vs. Comparison Teachers

Grade	Group	Pretest		Posttest		Adjusted Posttest	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Coop. T.	1.34	.44	2.22	.49	2.22	.35
	Comp. T.	1.36	.59	2.24	.64	2.24	.47
2	Coop. T.	2.49	.38	3.40	.60	3.40	.50
	Comp. T.	2.49	.69	3.34	.76	3.35	.76
3	Coop. T.	3.41	.51	4.33	.50	4.33	.51
	Comp. T.	3.41	.43	4.33	.52	4.33	.43
4	Coop. T.	4.27	.47	5.28	.62	5.28	.58
	Comp. T.	4.19	.73	5.12	.88	5.12	.86
5	Coop. T.	5.26	.57	6.25	.66	6.25	.63
	Comp. T.	5.15	.71	6.16	.84	6.16	.81
6	Coop. T.	6.34	.78	7.43	.90	7.43	.89
	Comp. T.	6.02	.83	7.09	.94	7.09	.93

Figure B.4
Mathematics: Analysis of Covariance Regression Results
for Hypothesis H1 (Equation H1b.2)

GRADE	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROBABILITY
1	Model	4	23.018	5.75	95.886	.0001
	Error	132	7.922	0.06		
	Total	136	30.940			
2	Model	5	33.973	6.794	91.104	.0001
	Error	98	7.309	0.074		
	Total	103	41.282			
3	Model	4	13.496	3.374	76.050	.0001
	Error	92	4.081	0.044		
	Total	96	17.577			
4	Model	3	29.115	9.705	125.698	.0001
	Error	67	5.173	0.077		
	Total	70	34.288			
5	Model	2	25.183	12.592	160.621	.0001
	Error	69	5.409	0.078		
	Total	71	30.593			
6	Model	2	43.699	21.849	400.641	.0001
	Error	61	3.326	0.054		
	Total	63	47.025			

Figure B.5

**Mathematics: Model Comparison F-Test Results
for Student Teacher Main Effects (Equations H1b.2 & H1b.3)**

Grade 1	Numerator =	.0907	df = 1	F =	1.3454
	Denominator =	.0600	df = 132	Prob. =	.248
Grade 2	Numerator =	.00069	df = 1	F =	.0092
	Denominator =	.0745	df = 98	Prob. =	.9238
Grade 3	Numerator =	.27	df = 1	F =	6.097
	Denominator =	.044	df = 92	Prob. =	.0154*
Grade 4	Numerator =	.0729	df = 1	F =	.9450
	Denominator =	.0772	df = 67	Prob. =	.3345
Grade 5	Numerator =	.0205	df = 1	F =	.2626
	Denominator =	.0784	df = 69	Prob. =	.61
Grade 6	Numerator =	.0605	df = 1	F =	1.1106
	Denominator =	.0545	df = 61	Prob. =	.2961

* statistically significant beyond alpha = .05

Figure B.6
Mathematics: Classroom Mean Scores
Cooperating Teachers' vs. Comparison Teachers

Grade	Group	Pretest		Posttest		Adjusted Posttest	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Coop. T.	1.22	.34	2.22	.38	2.22	.33
	Comp. T.	1.28	.59	2.21	.56	2.21	.49
2	Coop. T.	2.27	.28	3.39	.48	3.39	.39
	Comp. T.	2.32	.65	3.42	.76	3.42	.71
3	Coop. T.	3.30	.39	4.31	.48	4.31	.40*
	Comp. T.	3.22	.33	4.27	.37	4.27	.35
4	Coop. T.	4.18	.37	5.27	.60	5.27	.44
	Comp. T.	4.08	.69	5.17	.79	5.17	.81
5	Coop. T.	5.17	.48	6.30	.57	6.30	.55
	Comp. T.	5.12	.56	6.23	.74	6.28	.64
6	Coop. T.	6.37	.71	7.45	.83	7.45	.80
	Comp. T.	6.01	.71	6.97	.84	6.97	.80

Appendix C

Figure C.1

Reading: Analysis of Covariance Regression Results
for Hypothesis H2 (Equation H2a.1)

GRADE	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROBABILITY
1	Model	3	6.716	2.238	14.497	.0001
	Error	67	10.346	0.154		
	Total	70	17.063			
2	Model	6	14.859	2.476	30.926	.0001
	Error	44	3.523	0.080		
	Total	50	18.382			
3	Model	3	9.975	3.325	74.644	.0001
	Error	44	1.960	0.044		
	Total	47	11.935			
4	Model	4	12.010	3.000	58.986	.0001
	Error	31	1.578	0.051		
	Total	35	13.587			
5	Model	4	14.366	3.591	136.812	.0001
	Error	31	0.814	0.026		
	Total	35	15.180			
6	Model	3	25.979	8.659	417.834	.0001
	Error	30	0.622	0.022		
	Total	33	26.601			

Figure C.2
Reading: Model Comparison F-Test Results
for Semester Main Effects (Equations H2a.1 & H2a.2)

Grade 1	Numerator = .025	df = 2	F = .163
	Denominator = .154	df = 67	Prob. = .85
Grade 2	Numerator = .034	df = 2	F = .422
	Denominator = .08	df = 44	Prob. = .66
Grade 3	Numerator = .037	df = 2	F = .838
	Denominator = .044	df = 44	Prob. = .44
Grade 4	Numerator = .016	df = 2	F = .319
	Denominator = .05	df = 31	Prob. = .73
Grade 5	Numerator = .055	df = 2	F = 2.109
	Denominator = .026	df = 31	Prob. = .138
Grade 6	Numerator = .042	df = 2	F = 2.023
	Denominator = .021	df = 30	Prob. = .150

Figure C.3
 Reading: Classroom Mean Scores
 Fall vs. Spring vs. Both Semesters

Grade	Group	N	Pretest		Posttest		Adjusted Posttest	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Fall Only	28	1.29	.50	2.16	.53	2.16	.34
	Spring Only	31	1.37	.40	2.27	.42	2.27	.28
	Both	12	1.35	.44	2.20	.60	2.20	
2	Fall Only	10	2.46	.36	3.38	.57	3.37	.53
	Spring Only	29	2.43	.34	3.33	.57	3.33	.52
	Both	13	2.52	.39	3.47	.57	3.47	.56
3	Fall Only	12	3.69	.33	4.57	.38	4.57	.30
	Spring Only	28	3.24	.48	4.20	.52	4.20	.44
	Both	8	3.58	.64	4.41	.52	4.41	.59
4	Fall Only	16	4.30	.52	5.29	.68	5.29	.65
	Spring Only	14	4.21	.48	5.24	.67	5.24	.59
	Both	6	4.32	.34	5.37	.41	5.37	.42
5	Fall Only	13	5.24	.42	6.22	.52	6.22	.46
	Spring Only	15	5.46	.70	6.52	.77	6.52	.76
	Both	8	4.90	.37	5.79	.37	5.79	.37
6	Fall Only	7	5.82	.67	6.94	.88	6.94	.77
	Spring Only	19	6.60	.82	7.70	.94	7.70	.95
	Both	8	6.16	.54	7.21	.61	7.21	.62

Figure C.4
Mathematics: Analysis of Covariance Regression Results
for Hypothesis H2 (Equation H2b.1)

GRADE	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F	PROBABILITY
1	Model	5	6.664	1.333	25.104	.0001
	Error	65	3.451	0.053		
	Total	70	10.115			
2	Model	6	8.988	1.498	22.433	.0001
	Error	45	3.005	0.066		
	Total	51	11.993			
3	Model	5	8.750	1.750	32.726	.0001
	Error	42	2.246	0.053		
	Total	47	10.997			
4	Model	4	10.593	2.648	44.582	.0001
	Error	32	1.841	0.059		
	Total	35	12.434			
5	Model	3	8.937	2.979	37.096	.0001
	Error	32	2.569	0.080		
	Total	35	11.507			
6	Model	3	22.022	7.340	232.880	.0001
	Error	30	0.945	0.031		
	Total	33	22.967			

Figure C.5
Mathematics: Model Comparison F-Test Results
for Semester Main Effects (Equations H2b.1 & H2b.2)

Grade 1	Numerator = .016	df = 2	F = .298
	Denominator = .053	df = 65	Prob. = .74
Grade 2	Numerator = .093	df = 2	F = 1.463
	Denominator = .067	df = 45	Prob. = .24
Grade 3	Numerator = .0001	df = 2	F = .0014
	Denominator = .053	df = 42	Prob. = .99
Grade 4	Numerator = .109	df = 2	F = 1.842
	Denominator = .059	df = 32	Prob. = .175
Grade 5	Numerator = .040	df = 2	F = .503
	Denominator = .059	df = 32	Prob. = .609
Grade 6	Numerator = .016	df = 2	F = .507
	Denominator = .031	df = 30	Prob. = .607

Figure C.6
Mathematics: Classroom Mean Scores
Fall vs. Spring vs. Both Semesters

Grade	Group	N	Pretest		Posttest		Adjusted Posttest	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Fall Only	28	1.19	.39	2.19	.39	2.19	.33
	Spring Only	31	1.24	.34	2.27	.33	2.27	.25
	Both	12	1.23	.35	2.19	.47	2.19	.38
2	Fall Only	10	2.36	.34	3.44	.61	3.44	.50
	Spring Only	29	2.27	.24	3.35	.47	3.35	.38
	Both	13	2.20	.32	3.44	.45	3.44	.47
3	Fall Only	12	3.49	.22	4.54	.27	4.54	.24
	Spring Only	25	3.20	.40	4.20	.50	4.20	.44
	Both	8	3.38	.49	4.36	.57	4.36	.52
4	Fall Only	16	4.17	.45	5.32	.74	5.32	.66
	Spring Only	14	4.17	.35	5.19	.53	5.19	.50
	Both	6	4.24	.24	5.30	.22	5.30	.34
5	Fall Only	13	5.13	.36	6.26	.52	6.26	.36
	Spring Only	15	5.36	.54	6.54	.56	6.54	.55
	Both	8	4.87	.40	5.91	.51	5.91	.40
6	Fall Only	7	6.04	.72	7.13	.73	7.13	.83
	Spring Only	19	6.60	.75	7.68	.92	7.68	.86
	Both	8	6.13	.47	7.17	.56	7.17	.54